

## CLAIMS

We claim:

1. A method for removing organic contaminants from a substrate comprising the steps:
- holding said substrate in tank; and
- filling said tank with a gas mixture comprising water vapor, ozone and an additive acting as a scavenger.
2. A method as recited in claim 1, further comprising the step of adding oxygen or nitrogen or argon to said mixture.
3. A method as recited in claim 1, wherein the organic contaminant is a confined layer covering at least part of said substrate.
4. A method as recited in claim 3, wherein said confined layer has a thickness in the range of submonolayer coverage and  $1\mu\text{m}$ .
5. A method according to claim 1, wherein said gas mixture is in contact with said substrate.
6. A method as recited in claim 1, wherein said additive is acting as OH radical scavenger.
7. A method as recited in claim 1, wherein said additive is comprised of one of the following: a carboxylic acid, a phosphonic acid, or salts thereof.
8. A method as recited in claim 7, wherein said additive is acetic acid.
9. A method according to claim 1, wherein the proportion of said additive in said gas mixture is less than 10% molar weight of said gas mixture.
10. A method according to claim 9, wherein the proportion of said additive in said gas mixture is less than 1% molar weight of said mixture.
11. A method according to claim 10, wherein the

proportion of said additive in said gas mixture is less than 0.5% molar weight of said gas mixture.

12. A method according to claim 11, wherein the proportion of said additive in said gas mixture is less than 0.1% molar weight of said gas mixture.

13. A method according to claim 1, further comprising the step of rinsing said substrate with a solution.

14. A method as recited in claim 13, wherein the rinsing solution comprises de-ionised water.

15. A method as recited in claim 14, wherein said solution further comprises one of the following: HCl, HF, HNO<sub>3</sub>, CO<sub>2</sub> or O<sub>3</sub>.

16. A method as recited in claim 14, wherein said solution is subjected to megasonic agitation.

17. A method as recited in claim 1, further comprising the steps of:

filling said tank with a liquid comprising water and said additive, the liquid level in said tank remaining below said substrate, and

heating said liquid.

18. A method as recited in claim 17, wherein the filling of said tank is with ozone.

19. A method as recited in claim 18, wherein the ozone is bubbled through the liquid.

20. A method as recited in claim 17, wherein the temperature of said liquid is between 16°C and 99°C.

21. A method as recited in claim 20, wherein the temperature of said liquid is between 20°C and 90°C.

22. A method as recited in claim 21, wherein the temperature of said liquid is between 60°C and 80°C.

23. A method as recited in claim 1, wherein the water vapor is a saturated water vapor.

24. A method as recited in claim 1, wherein the

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ozone concentration in the mixture is less than 10% molar weight of said mixture.

25. A method as recited in claim 1, wherein the temperature of said mixture is below 150°C but higher than the temperature of said substrate.

26. A method as recited in claim 1, wherein said substrate is a silicon wafer.

27. A method for removing organic contaminants from a substrate, comprising the steps of:

10                   immersing said substrate in a liquid  
comprising water, ozone and an additive acting as a  
scavenger; and

maintaining said liquid at a temperature less than the boiling point of said liquid.

15 ~~228~~. A method as recited in claim 27, wherein said temperature is lower than 100°C.

~~29. A method as recited in claim 27, wherein a liquid is sprayed over said substrate.~~

A 30. A method as recited in claim 27, wherein said  
20 temperature is between 16°C and 99°C.

31. A method according as recited in claim 30, wherein the temperature of said liquid is between 20°C and 90°C.

6 ~~32~~. A method according as recited in claim 31,  
25 wherein the temperature of said liquid is between 60°C and  
80°C.

135. A method as recited in claim 27, wherein said liquid is subjected to megasonic agitation.

~~34~~. A method as recited in claim 27, wherein the  
30 ozone is bubbled through the liquid.

935. A method as recited in claim 27, wherein the organic contamination is a confined layer covering at least part of said substrate.

A method as recited in claim 35, wherein said  
r has a thickness in a range of submonolayer  
1  $\mu\text{m}$ .

A method as recited in claim 27, wherein said  
acting as OH radical scavenger.

A method as recited in claim 27, said  
comprised of ~~one of the following~~: a carboxylic  
onic acid or salts thereof.

A method as recited in claim ~~38~~, wherein said cetic acid.

A method according to claim 27, wherein the said additive in said liquid is less than 1% of said liquid.

A method according to claim 40, wherein the said additive in said liquid is less than eight of said liquid.

A method according to claim ~~41~~<sup>42</sup>, wherein the amount of said additive in said liquid is less than the weight of said liquid.

A method as recited in claim 27, wherein the  
are contacting said organic contaminants.

A method as recited in claim ~~27~~, further  
the step of rinsing said substrate with a

A method as recited in claim ~~44~~<sup>41</sup>, wherein said  
rises de-ionised water.

A method as recited in claim 45, wherein said  
 her comprises one of the following: HCl, HF,  
 O<sub>3</sub>.

A method as recited in claim ~~44~~, wherein said  
subjected to megasone agitation.,

A method as recited in claim ~~27~~, wherein said  
a silicon wafer.

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holding said substrate in tank; and

5 water, ozone and an additive acting as a scavenger, and wherein the proportion of said additive in said fluid is less than 1% molar weight of said fluid.

less than 1% molar weight of said fluid.

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**Q&A**